INDUSTRIALIZED ACTIVITIES AND LABOR RELATIONS

MAINTENANCE AND LAYAWAY OF GOVERNMENT-OWNED, CONTRACTOR-OPERATED FACILITIES

HEADQUARTERS, US ARMY MATERIEL COMMAND

DEPARTMENT OF THE ARMY
HEADQUARTERS, UNITED STATES ARMY MATERIEL COMMAND
5001 EISENHOWER AVENUE, ALEXANDRIA, VA 22333-0001

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CHAPTER 1

MAINTENANCE AND LAYAWAY OF FACILITIES-GENERAL

1-1. PURPOSE. This pamphlet contains practical standards which should be used as guidelines for the operation and maintenance of active real property, and for the layaway and subsequent maintenance of inactive real property. The guidelines contained herein also form the necessary minimum standards and documentation evaluated during the Headquarters, U.S. Army Materiel Command (HQ AMC) scheduled Facilities Engineering/ Energy Program Reviews conducted in accordance with AR 420-10. (Family housing operation and maintenance are not addressed in this pamphlet.)

1-2. SCOPE.

a. This pamphlet applies to HQ AMC, AMC major subordinate commands, and separate installations and activities having Government-owned, contractor-operated (GOCO) plants or activities under their command jurisdiction.

b. The guidance in this pamphlet applies to the maintenance and layaway of AMC GOCO real property. Additionally, this pamphlet can be used in conjunction with other publications, such as TM 38-260, Preparation of Industrial Plant Equipment for Storage and Shipment, which prescribes policies and procedures for the layaway of production equipment; and TB 700-4, Decontamination of Facilities and Equipment, that addresses necessary decontamination prior to layaway.

c. Wherever a requirement is identified for submitting/obtaining AMC technical approval/guidance, this means the request should be submitted through command channels to the Commander, USAMC Installations and Services Activity, ATTN: AMXEN, Rock Island Arsenal, Rock Island, Illinois 61299-7190.

1-3. ORGANIZATION. This pamphlet is separated into chapters: Chapter 1 is general, chapter 2 pertains to the active installations, and chapter 3 pertains to the layaway and subsequent maintenance of inactive installations. Chapters 2 and 3 are subdivided into the following sections:

I. Buildings, structures, roads, surfaced areas, railroads and bridges.

II. Utilities.

III. Natural resources--maintenance of land, forests and wildlife.

IV. Fire prevention and protection.

V. Refuse collection and custodial services.

VI. Pest Management services.

1-4. MAINTENANCE AND/OR LAYAWAY PLAN. All AMC real property should be covered by a formal operation and maintenance program. This pamphlet and Department of Defense/Army/AMC Regulations, Army Technical Manuals (Tms), manufacturers publications, U.S. industry standards and specific Public Code requirements, should be used to establish a maintenance plan and/or deactivation (layaway) plan tailored to each installation's real property. Precedence for compliance with any conflicting guidance is: (1) Public law, (2) applicable manufacturers' requirements, and (3) technical guidance in the aforementioned regulations, TMs and industry standards as modified by this pamphlet. Each plan should be in sufficient detail to schedule, prioritize, accomplish, document accomplishment, and perform surveillance on all work. The plan will include the installation's Capital Improvement Program (CIP) developed in accordance with AR 210-20 and AMC CIP guidance. Projects identified in the CIP should be consistent with the maintenance plan and reflect the goals and policies outlined in the AMC Installation Beautification Program and Installation Design Guide. All design criteria will be consistent with the Corps of Engineers Architectural and Engineering Instructions.

1-5. BACKLOG OF MAINTENANCE AND REPAIR (BMAR). See definition of BMAR contained in AR 420-16. The Contractor's maintenance plan should establish procedures that identify real property requirements meeting the definition of BMAR.

CHAPTER 2

MAINTENANCE AND OPERATION OF ACTIVE REAL PROPERTY FACILITIES

Section I. BUILDINGS, STRUCTURES, ROADS, SURFACED AREAS, RAILROADS AND BRIDGES

2-1. **GENERAL**. The maintenance and repair guidance set forth in this chapter is applicable to all active real property. This section, along with AR 420-70 (Buildings and Structures), AR 42072 (Surfaced Areas, Railroads, and Associated Structures) and the TMs contained in the Appendix, should be used to develop the technical requirements for buildings, structures, roads, surfaced areas (including airfields, runways and pads), railroads and bridges. The maintenance of associated drainage facilities to avoid water damage to structures, surfaced areas and road and rail beds will be included.

2-2. **BUILDINGS AND STRUCTURES**.

a. Organization.

(1) The maintenance plan should include a formal facilities maintenance program. The program documentation should include an up-to-date set of maps showing the location of all buildings and structures. Maps should identify current status of the facilities (active or inactive, high or low state of readiness), and provide the following information, either on the maps or on separate sheets with the maps:

(a) BMAR project listing: in accordance with paragraph 1-5.

(b) A listing of all major (over $100,000) maintenance and repair projects accomplished in the preceding 5 years.

(2) The maintenance program should include scheduled building inspections. The inspection frequency will vary depending upon the status of the building; however, as a minimum, all buildings should be inspected semiannually. The building inspection forms the basis for the entire maintenance program and should be performed by personnel qualified in building maintenance. Inspection documentation should include a systematic recording of deficiencies, and initiation and completion of corrective action.

(3) Concurrently, potential or actual damage to real property by insects (termites) or other pests (rodents, fungi/wood rot, birds) should be documented and corrective actions planned within the scope of routine maintenance and repair work.

b. Maintenance standards.

(1) Except as provided in (2) below, replacement materials which are more durable and provide longer life should be substituted for original materials when the increased cost of the more durable materials can be economically justified. Asbestos-containing products will not be utilized. Asbestos waste will be properly managed in accordance with the AMC Asbestos Management and Control Program, latest guidance.

(2) In lieu of repainting, new exterior siding materials should be applied over existing siding when--

(a) Life cycle costing indicates that installation and maintenance of new siding would be more economical over the planned remaining useful life of the structure than repairing the existing siding and repainting at normal paint cycles.

(b) The planned period of use is in excess of 12 years.

(3) Patch or repair roofs to maintain weathertight conditions. Reroofing should be accomplished only when the above method no longer provides weathertight protection or is no longer economically feasible.

(4) Metal fences should not be painted for preservation purposes. Fences in the administrative area or at main entrances may be painted when aesthetics are considered essential.

(5) Painting frequencies should be within the limits established below. Where the time interval between painting cycles can be extended without causing undue deterioration, extension is encouraged.

(a) Exterior masonry--6 to 8 years.

(b) Exterior wood--spot prime and one finish coat, 3 to 4 years; spot or full prime and two finish coats, 5 to 6 years.

(c) Exterior metals--spot or full prime and one finish coat, 4 to 5 years.

(d) Interior surfaces--4 to 5 years. (Hospital-operating suites, clinics, laboratories, food preparation areas, mess halls, ammunition production areas or other similar interior spaces may be painted on a 3-year cycle where necessary to maintain sanitary or safe conditions.)

2-3. ROADS AND SURFACED AREAS.

a. Organization.

(1) The maintenance plan should include a formal road program. The maintenance program should conform to the AMC PAVER policy and TM 5-623, Pavement Maintenance Management, as applicable. The road maintenance program should include a map or set of maps depicting all roads and surfaced areas and current status (active/inactive), and provide the following information, either on the maps or on separate sheets included with the maps:

(a) BMAR project listing, in accordance with paragraph 1-5.

(b) A listing of all major (over $100,000) maintenance and repair projects accomplished in the preceding 5 years.

(2) Provide for inspection of all roads and surfaced areas by qualified personnel at least annually. Inspections for maintenance and repair of traffic control devices should be accomplished semiannually. The inspections identify required maintenance and repair work which forms the basis of the annual road maintenance program. Deficiencies noted during inspections should be recorded, appropriate action for correction initiated, and final results recorded.

b. Maintenance standards.

(1) The routine road maintenance program should include crack sealing, spot repair, shoulder and drainage maintenance and provisions for snow and ice control. Surface treatments including slurry seals, chip seals and overlays should be accomplished in spot locations when the existing surface deteriorates to the point where surface treatment is necessary to maintain integrity and serviceability. Recycling should be considered when evaluating repair alternatives for major repair or reconstruction projects.

(2) Blade gravel and stabilized-surfaced roads when necessary to crown for drainage and to eliminate excessive roughness.

(3) Traffic control and/or warning devices should conform to the provisions of the Manual of Uniform Control Devices for Streets and Highways, (Latest) edition, (ANSI D6.1-19XX), available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20492. Traffic-control devices adopted by the state where the installation is located may be used upon AMCI&SA approval.

(4) The use of state highway specifications and materials is encouraged since local contractors are familiar with these specifications. The use of proprietary products on a large scale requires prior approval of Department of the Army (DA). State highway specifications shall not be used for airfields.

2-4. RAILROADS.

a. Organization.

(1) The maintenance plan should include a formal railroad system program. The program should include a map or set of maps depicting status (active/inactive), location and weight of each type of rail, switches and controls, lengths and types of bridges and trestles, and the car capacity of yard siding and warehouse tracks. Program documentation should include:

(a) BMAR project listing, in accordance with paragraph 1-5.

(b) A listing of all major (over $100,000) maintenance and repair projects accomplished in the preceding 5 years.

(2) Provide for inspections of active railroad trackage per the DA Railroad Track Maintenance Standards. Maintain records of inspections, deficiencies noted, and corrective actions taken.

b. Maintenance standards.

(1) DA Railroad Trackage Maintenance Standards should be used for maintenance and inspection of all railroads.

(2) Use relayer rail meeting the requirements of MILR-3911 where operating conditions permit and where savings result.

(3) New rail should comply with MIL-R-3518B and be of the 90-pound American Railway Engineering Association (AREA) Standards (latest edition) section or heavier if more' economical. The 115-pound AREA rail should be used only to meet the minimum requirements of the serving railroad when operating its own locomotives on Army trackage.

(4) Existing lightweight rail in good condition, meeting operational requirements, should not be replaced.

(5) Vegetation control will be in accordance with TM 5-628, Railway Track Standards.

2-5. BRIDGES.

a. Organization.

(1) The maintenance plan should include a formal bridge program. The program should include a map or set of maps depicting each bridge. Each bridge having a span, or spans, of 20 or more feet in length should have a separate file containing records of bridge inspections and analyses, and current rated load carrying capacity. Program documentation should include:

(a) BMAR project listing in accordance with paragraph 1-5.

(b) A listing of all major (over $100,000) maintenance and repair projects accomplished in the preceding 5 years.

(2) Provide for inspection of each bridge at least annually. Records should show deficiencies noted and corrective actions taken.

b. Maintenance Standards.

(1) Perform bridge inspection and analysis in accordance with AR 420-72 utilizing the services of a qualified engineer.

(2) Revalidate the safe load carrying capacity of bridges triennially.

(3) Post safe load limit on bridges not capable of carrying design loads.

Section II. UTILITIES

2-6. GENERAL. The guidance set forth in this section is applicable to all utility plants and systems. Asbestos-containing products will not be utilized, and asbestos removal and disposal will be consistent with the AMC Asbestos Management and Control Program, latest guidance. Pentachlorobyphenyls (PCBs)-containing electrical equipment will not be installed, and PCBs will be controlled per the latest environmental guidance. Chlorofluorocarbons (CFCs) coolants will be captured by scavenging equipment and not released to the environment where economically feasible, or required by Public Law. The maintenance plan should include a formal utilities operations and maintenance program. The program documentation should include:

a. BMAR project listing, in accordance with paragraph 1-5.

b. A listing of major (over $100,000) maintenance and repair projects accomplished in the preceding 5 years.

c. Contingency plans, in addition to normal operation and maintenance plans, of actions to be taken if a utility supply or source should fail either on or off the installation.

2-7. ENERGY CONSERVATION AND UTILIZATION. The maintenance program at each installation should include requirements for energy conservation and efficient utilization of real property facilities and utilities.

a. Steam distribution and condensate systems, including equipment, insulation, valves, steam traps, etc., should be repaired, maintained and replaced, when necessary, with energy efficient and properly sized components. Refractory and insulation on boilers and associated equipment should be kept in good repair.

b. Heating and cooling systems should be maintained by keeping dirt, dust and other foreign material clear of radiators, heating and cooling coils and protective screening. Replace and/or clean filters as required to assure maximum operating efficiencies. Maintain required fluid levels. Assure duct work, transitions and expansion joints are not leaking, and that controls, dampers, etc., are operating properly.

c. Buildings should be maintained in an energy efficient condition. Repair holes, cracks, and insulation. Caulk, weatherstrip and repair broken windows. Use insulated glazing and other energy conserving building materials where economically feasible. Consolidate working functions to optimize space utilization and isolate inactive areas to minimize heating and cooling requirements.

d. Maintain electrical systems for maximum efficiency. Substations,transformers, electric motors and other equipment should be properly sized for the load. Lighting replacements should utilize energy efficient bulbs and fixtures. Clean lights and fixtures for maximum brightness. Deactivate excessive and unnecessary lighting in nonwork areas, such as corridors or vestibules. Keep photocells and other electronic monitoring/operating device clean.

e. Requirements for heating and cooling building temperatures, domestic hot water temperature, humidity control and lighting levels are detailed in AR 11-27.

2-8. ENVIRONMENTAL PROTECTION.

a. Environmental program management should be in accordance with Ars 200-1, 200-2, 420-40 and 420-47. All federal, state, and local environmental regulations will be adhered to.

b. The environmental program should identify support for environmental audits conducted at the installation. The support includes file preparation for audit personnel review and escort service throughout the installation for the audit team.

c. Assistance.

(1) Specialized services may be needed that are not within the resources of the installation. Periodic surveys of the several programs within the Army Occupational Health Program and AMC Environmental Quality Program are desirable and necessary to effect adequate control and to facilitate planning. The Surgeon General, DA, and the U.S. Army Health Services Command maintain agencies to support these programs through the provision of services and investigations. These services should be requested in accordance with AMCI&SA guidance.

(2) The U.S. Army Environmental Hygiene Agency is available for consultation regarding specific environmental problems upon request through AMCSG-S.

(3) Technical assistance in the identification and correction of environmental problems should be obtained through AMCI&SA.

(4) Environmental training is available through the Army Logistics Management College at Ft. Lee, Va.

2-9. UTILITY CONTRACTS. Acquisition of utility services will be in accordance with AR 420-41, AMC Suppl 1 to AR 420-41; and ASPR Supplement No 5. Any utilities purchase contract should be between the utility supplier and the government. Sale of utilities to other governmental agencies, lessees of industrial facilities and nonfederal organizations should be by written contract per AR 420-41. Contracts for utilities services must be awarded through competition; sole source contracts must have the required justification and approval. Contact AMCI&SA for further guidance.

2-10. SAFETY DEVICES. Boilers; steam and hot water distribution systems; furnaces; water heaters and tanks; gas compression, storage, and distribution systems; electrical equipment and distribution systems; etc., should be equipped with adequate safety devices. The safety devices are prescribed by the American Society of Mechanical Engineers (ASME), National Fire Protection Association (NFPA), and American National Standards Institute (ANSI) safety codes for protection of life, equipment and property. Safety devices should be installed so they cannot be rendered ineffective. These devices should be regularly inspected and tested.

2-11. UNFIRED PRESSURE VESSELS AND GAS COMPRESSORS.

a. The testing and inspection of unfired pressure vessels and gas compressors up to 6,000 pounds per square inch gauge (psig) should comply with AR 420-49.

b. Standards, as included in DARCOM Suppl 1 to AR 420-49.

(1) Safety valves set to operate at 115 percent, plus or minus 5 percent of normal operating pressure.

(2) Unloaders set to unload at not more than 5 percent over the normal operating pressure of the final compressor stage.

(3) Test pressure gages certified as accurate within 2 percent of the applicable normal operation and test pressure.

(4) After testing and adjustment, safety valves and unloaders with appropriate attachments should have a circular lead seal and copper wire applied to the adjustment cap. Safety valves and unloaders without provisions for a wire seal should have the adjustment identified with pressure sensitive tape. Do not cover the operating mechanism or exhaust opening with tape. A metal tag indicating the date of the last test and scheduled date of the next test should be applied to each compressor and be readily visible to operating personnel.

2-12. CORROSION CONTROL.

a. A corrosion control program should be established under the direction of a professional engineer. The technical requirements should comply with DARCOM Suppl 1 to AR 420-49.

b. The maintenance program should provide for inspection, maintenance and repair on all installed cathodic protection systems. Evaluation should be made for performing the required system maintenance by separate service contract with a firm specializing in cathodic protection.

2-13. RECORDS. Utility plant operation and maintenance records necessary to provide a continuing log of activities are identified in specific ARs and TMs, and must be selected for use at each installation. Standard DA forms should be utilized, and the log kept current and available for technical review.

2-14. OPERATION AND MAINTENANCE OF UTILITY PLANTS AND SYSTEMS.

a. Electrical systems.

(1) The operation and maintenance program should stress safety compliance and adherence to all applicable codes.

(a) Develop standing operating procedures covering safe practices for switching of the electrical distribution system and post in all switching stations, substations, electrical shops and line maintenance trucks.

(b) System maps should be kept up-to-date and show all lines and service drops, transformer ratings, voltages, pole numbers, conductor sizes, switches, fuses, breakers and their ratings. A power pole numbering system should be established and maintained current.

(c) Key components of the electrical system will be inspected, tested, and maintained in accordance with TM-5-683 and TM-5-684.

(2) New and replacement power poles should be fully treated to retard decay.

b. Boiler plants and heating systems.

(1) The operation and maintenance program should stress safety compliance and adherence to all applicable codes. The ASME Boiler and Pressure Vessel Code, along with AR 420-49 and DARCOM Suppl 1 to AR 420-49, are basic guides. A boiler plant standing operating procedure should be developed for each boiler room covering preventive maintenance and operation, safety devices, combustion controls, and start-up and shut-down. It should also define the duties of operating personnel during normal and emergency conditions.

(a) At all continuously attended high-pressure boiler plants, a 24-hour operating log should be maintained showing: operator's name, steam pressure, steam flow, deaerator heater temperature and pressure, percent oxygen or carbon dioxide, temperature of the flue gas, boiler makeup and feedwater quantities, chemical feeds, test results and any operational irregularities.

(b) Plant operators should obtain a state or local operating engineer's certification, where available. If no state or local certification is available, the contractor should issue certification per AR 420-15.

(2) Steam boilers operating at gauge pressures above 15 psig should have an annual internal and external inspection. Hot water boilers operating at temperatures of 250 degrees F or above, and pressure of 160 psig or above, should be externally inspected annually while under operation. Internal inspections should be at 3-year intervals, providing inspections made after the first and second year of continuous operation indicate no adverse conditions. Inspection reports should be on the standard DA Form 416 (Boiler Inspection Report) or AF Form 1222. A blanket contract for boiler inspection is available to all installations. Contact AMCI&SA for details. Hydrostatic tests should be conducted only under the conditions listed below:

(a) Upon initial boiler installation.

(b) After completion of major repair of any boiler component subject to steam or water pressure.

(c) When returning inactive boilers to service.

(d) When otherwise specifically recommended by the boiler inspector or plant engineer.

The hydrostatic test pressure should be one and one-half times the allowable boiler working pressure, which is normally the pressure at which the safety valves are set and not the boiler operating pressure. Deficiencies indicated on the inspection report should be corrected as soon as practicable and the corrective action recorded on section VIII of the report. One completed copy of the boiler inspection report should be posted near the boiler and one copy forwarded to AMCI&SA within 10 days after completion of the inspection.

(3) Boiler water treatment for plants operating at less than 15 psig is normally limited to adding caustic soda to maintain a boiler water pH above 10.

(4) Feedwater for steam boilers operating at 15 psig or more is normally externally treated (softened) to prevent scale and corrosion of the steam and condensate return systems. Internal boiler water treatment consists of introducing the proper amounts of caustic soda, sodium phosphate, tannin (or equivalent sludge conditioner) and sodium sulfite. A neutralizing amine should also be added when the amount of boiler makeup water required is low. The following limitations governing operating conditions and boiler water chemical residuals are considered adequate for control of scale and corrosion:

(a) Tannin--light (2) to dark (4) color using standard tannin color comparator.

(b) Hydroxide--20 to 200 parts per million (PPM).

(c) Phosphate--30 to 60 PPM.

(d) Sulfite--20 to 40 PPM.

(e) Total dissolved solids (TDS)--3,000 to 3,500 PPM.

(f) Condensate return pH 7.5 to 8.5.

(g) Tests for determining the above chemical residuals should be performed during each shift and the results recorded on the plant log. Boiler water samples should be submitted monthly to the U.S. Army Engineering and Housing Support Center, Ft. Belvoir, VA 22060-5516. The boiler water test kits and monthly analysis are available without charge. The use of commercial service contracts to perform or supervise boiler water treatment is not authorized unless proven more economical. A request for deviation from policy should be submitted to AMCI&SA if commercial services are calculated to be more economical.

(h) The operating temperature of the deaerating heater should be the boiling point of water at the pressure maintained in the heater.

(5) Operate all fuel burning plants in such a manner that the quantities of soot, fly ash, smoke and noxious gas emitted to the atmosphere remain within the limits established by law. The contractor should obtain and maintain current all required permits. Solid fuels should be procured through the Defense Fuel Supply Center (DFSC), unless exempted in writing. The fuels should be sampled and tested for quality by qualified installation personnel. Proposed fuel conversions require special processing and approval. For details and guidance on coal procurement and sampling, and fuel conversions, contact AMCI&SA.

(6) Unattended operation of fully automatic high-pressure boilers up to 14 million British thermal units (BTUs) per hour capacity may be feasible. Requests for use of automatic controls and unattended high-pressure boiler operation should be forwarded to AMCI&SA citing all pertinent data, such as: location of line or area, buildings served, average and peak loads, boiler make, age, rating and fuel, automatic controls proposed, and a plan for periodic surveillance and preventive maintenance.

(7) Condensate from steam coils installed in oil storage tanks, pickling tanks, electro-plating baths, degreasing and similar process equipment should not be returned to avoid contamination of boiler water in event of equipment malfunction.

c. Air compressors and compressed air distribution systems.

(1) Standing operating procedures should be posted in each compressor room covering operating and maintenance recommendations and instructions on cooling, lubrication, belt tension, safety devices, control adjustments, starting and stopping. Inspections and tests of air compressors and receivers should comply with DARCOM Suppl 1 to AR 420-49.

(2) Air distribution systems should be inspected for leaks, pipe vibration, defective supports, and leaking valves at 90-day intervals. Air dryers and filters should be inspected for proper operation every 90 days. Safety, pressure reducing and flow control valves should be checked frequently to ensure that the system pressure does not exceed the allowable pressure rating of piping and tanks. Defects should be recorded and promptly repaired.

d. Heating, ventilation, air conditioning, and refrigeration systems.

(1) Maximum/minimum temperatures are specified in AR 11-27.

(2) Keep closed circulation hot water heating systems free of leaks and drain only when absolutely necessary. Sufficient caustic soda should be added to maintain pH of the water above 8.5.

(3) Keep air conditioning chillers and associated heat exchange coils protected from freezing. Refrigerant piping should be protected from vibration and the systems periodically tested for leaks. Records on refrigerant usage should be maintained.

(4) Open circulating cooling systems, such as evaporative condensers and cooling towers, should receive adequate chemical treatment to prevent corrosion, scale, sludge and biological deposits. The effluent from these systems should comply with established environmental standards. The use of commercial service contracts to perform or supervise the chemical treatment is not authorized unless proven to be more economical. A request for deviation from policy should be submitted to AMCI&SA if commercial services are calculated to be more economical.

e. Water supply and distribution systems.

(1) The operation and maintenance program should stress safety compliance and adherence to all applicable codes. The program should include necessary operation, maintenance and testing of stationary fire pumps and the fire flows, and personnel notification and their duties during emergency situations. Water distribution lines and valve location maps should be kept current. Pumping stations should have a posted standing operating procedure and a piping diagram identifying each valve and pump. Main line water distribution valves and all fire hydrants should be exercised annually.

(2) Potable water quality standards should conform to the established standards of the U.S. Environmental Protection Agency and/or state agencies. Water treatment and quality should comply with TB Med 576, Occupational and Environmental Health, Sanitary Control and Surveillance of Water Supplies at Fixed Installations.

(a) Minimum free and combined bactericidal chlorine residuals should be maintained at all times in all parts of the potable water distribution system that is under constant circulation. TB Med 576 should be consulted to determine minimum free and combined chlorine residuals in the event of water system problems.

(b) Since trihalomethanes (THM) are formed by the reaction of naturally occurring organic substances with chlorine, chlorination methods may have a dramatic effect on the resultant THM level. Installations obtaining raw water from surface sources and practicing pre- and post-chlorination should reduce prechlorination dosages to the lowest level consistent with trace chlorine maintenance through the treatment system. Post-chlorination should then be used to achieve required chlorine residuals for the distribution system.

(c) For water systems which serve a population of 10,000 or more, the Environmental Protection Agency (EPA) National Interim Primary Drinking Water Regulations (NIPDWR) have set a maximum contaminant level (MCL) of 0.10 mg/L for total THMs, defined as the sum of the concentrations for chloroform, bromodichloromethane, dibromochloromethane, and bromoform. Since THMs can continue to form after chlorine is applied, MCLs are applicable in the distribution system, measured by a running annual average of at least four points in the system at no less than quarterly intervals. Individual states should be consulted for applicable standards, which should be at least as stringent as the EPA standards. Sampling and analysis of THMs should be either by EPA's Purge and Trap Method 501.2, or by Liquid/Liquid Extraction Method 501.2, per 40 CFR Part 141, Subpart c, appendix c. Residual free available chlorine (FAC) should be determined by using the Diethyl-P-Phenylenediamine (DPD) or another EPA-approved method that specifically measures FAC. Combined chlorine residuals can be determined by tests that provide the total chlorine present from which the FAC can be subtracted. The DPD and other EPA-approved test methods are described in the latest edition of "Standard Methods for the Examination of Water and Wastewater," as published jointly by the American Public Health Association, the American Water Works Association, and the Water Pollution Control Federation.

(d) If bacteriological tests do not indicate that treated water is free of coliform organisms, then the prescribed chlorine residuals should be raised to a level that produces the required results. The bacteriological test method should be either the multiple tube fermentation technique or the membrane filter technique, unless states that have primary enforcement responsibility designate one method over the other. The test rate should be one sample per month per 1,000 population with a minimum of 8 samples per month.

(e) Submit representative samples of each water source to a State certified laboratory for bacteriological testing. Annually, one copy of the analysis report should be forwarded to AMCI&SA.

(3) A daily operating log should be maintained for recording all pertinent water information, including quantity of raw and treated water, chemical treatment, presumptive and confirmed bacteriological test results, color, alkalinity and hardness.

f. Water treatment and distribution systems and waste water collection and treatment systems. The operation and maintenance program should assure that requirements are met for inspecting, testing and maintaining water treatment and distribution systems and waste water treatment systems, according to applicable codes and operating permits or regulatory agency requirements. Waste water collection and treatment system and water distribution system maps should be kept current, and standing operating procedures, piping diagrams, etc., should be posted in water treatment plants.

g. Sewage collection and disposal systems.

(1) The operation and maintenance program should stress safety compliance and adherence to all applicable codes. Sewage collection system maps should be kept current, and standing operating procedures and plant piping diagrams be posted in sewage treatment plants.

(2) Sewage discharge from the installation should meet the pollution limitations established by the local, state and federal environmental agencies. The contractor should obtain and maintain current the required discharge permits. Representative samples of the effluent should be collected and tested by a state certified laboratory.

(3) A daily operating log should be maintained for recording all pertinent sewage information, including quantity of treated sewage, type of treatment and results of tests.

h. Gas distribution systems. The operation and maintenance program should stress safety compliance and adherence to all applicable codes. The program should specify distribution line quarterly inspection and procedures to be followed during emergencies.

i. Steam and hot water distribution systems. The operation and maintenance program should stress safety compliance and adherence to applicable codes. An up-to-date set of distribution maps should be readily available. The system should be inspected monthly for leaks, loose anchors, deteriorated insulation, vibration, misalignment and cleanliness. Pressure relief valves should be tested annually by lifting manually, and biennially by test popping under pressure using a test stand.

j. Petroleum, oil and lubricant (POL) storage, distribution and transfer. The operation and maintenance program should stress safety compliance and adherence to applicable codes. Up-to-date drawings should be available. Checks for leakage, sediment, and water in storage and transfer equipment should be made monthly. Ground wires should be inspected for physical damage monthly and the grounding system electrically tested annually to ensure that the resistance to ground is 25 ohms or less. Tanks should be cleaned under the direction of a safety engineer when sediment accumulates to a depth of 2 inches. The current Federal Law governing underground storage tanks (UST) must be followed when establishing the maintenance program.

Section III. NATURAL RESOURCES - MAINTENANCE OF LAND, FORESTS AND WILDLIFE

2-15. GENERAL. Provide for a Natural Resources Program as outlined in this section. The services of professional agronomists, foresters and wildlife biologists should be utilized in planning and executing the program. An Installation Natural Resources Report (RCS DD-Mil-(A)670) should be prepared and submitted to AMCI&SA by 30 October each year. Natural Resources Management Plans should be reviewed annually and revised to reflect current conditions, and major revisions of all parts accomplished at least every 5 years.

2-16. LAND MANAGEMENT AND GROUNDS MAINTENANCE.

a. Natural Resources Management Plan, Parts I and II. Part I, General, and Part II, Land Management and Grounds Maintenance, should be prepared and implemented for each installation exceeding 500 acres or with 50 acres or more of improved grounds. Assistance of local, state or federal agricultural and conservation agencies should be utilized in the preparation and revision of the plan. The formats for parts I and II are contained in TM 5-630, Natural Resources Land Management.

b. Annual work plan. Plans for grounds maintenance activities should be prepared for each installation required to prepare parts I and II. Preparation should be in accordance with AR 420-74 and AMCI&SA letter guidance, and be submitted to AMCI&SA by 15 February each year.

c. Agricultural and grazing outleases. All land should be under constant review to determine suitability for outleasing. If found suitable, after consultation with local agricultural agencies, a Report of Availability should be prepared and forwarded to AMCI&SA. Reports of Availability should be made as far in advance of availability as practical, or 6 months prior to lease expiration, in cases of existing leases. These reports should take into account normal local seasons for planting and grazing. See AR 405-80 for information on the contents of the Report of Availability. Prior to report submission a Tract Management Plan should be prepared and submitted as described in the paragraph below. Information on the area available for outleasing and technical provisions outlining conservation measures and practices to be performed by the lessee should be provided in the plan.

d. Tract Management Plan. An individual Tract Management Plan is required for each parcel of land leased. The plan should include a map

or aerial photograph indicating boundaries, acreage of individual fields, and soil capability. It should provide detailed information on crop rotation, fertilizer and lime requirements, conservation practices, fence specifications, grazing season, and number of animal units supported. It should also detail the maintenance services to be performed by the lessee, such as mowing roadsides, cemeteries and firebreaks, repairing livestock fences, and controlling weeds. Lessee maintenance services in lieu of cash rental reduces installation maintenance costs and should be specified whenever possible. Tract Management Plans, along with the Report of Availability, should be forwarded to AMCI&SA for technical review. Technical assistance in preparing Tract Management Plans is available from local U.S. Department of Agriculture (USDA) Soil Conservation Districts.

e. Land use restrictions. Tract Management Plans should comply with Federal laws and regulations restricting production of price-supported crops on Government-owned lands. Conservation practices, such as contouring, terracing, strip cropping and grass waterways should be required, where necessary, to avoid and/or control soil erosion and pollution of water channels.

f. Agricultural and grazing annual work plans. Plans should be prepared and submitted to AMCI&SA by 15 February each year. Plan content should be based on guidance provided by AMCI&SA and current regulations. Expenses relating to the operations of the agricultural program, including natural resource improvements, are eligible for special reimbursable funds. However, preparation of parts I and II, revisions, and Annual Work Plans are basic land use planning; they are inherently part of the basic contract, and not dependent on reimbursable funding.

2-17. FOREST MANAGEMENT.

a. Natural Resources Management Plan, Part III. A comprehensive Forest Management Plan should be prepared and implemented for each AMC installation having 100 acres or more of land presently or potentially available for timber production and capable of producing at least 20 cubic feet/acre/year of forest products per AR 420-74 and TM 5-631. The plan and revisions thereto should- be prepared, or all technical data furnished, by a qualified forester in accordance with guidelines presented in TM 5-631, appendix A. Assistance may be obtained from the AMC forester, state or federal forestry agencies. The use of private consulting foresters is encouraged when services of Government foresters are not available.

b. Annual Work Plan. Installations required to prepare a Forest Management Plan are also required to prepare an Annual Work Plan. This Annual Work Plan should be developed in the suggested format provided in TM 5-631, annex I to appendix A. Because of the use of special funds for forestry operations, this plan should be forwarded to reach AMCI&SA by 15 February of each year.

c. Funding. Expenses related to production and disposal of timber products should be charged to budget program 728012.26000. At installations having an approved Forest Management Plan, these expenses will be reimbursed. Production and disposal expenses include: marking, volume computation, preparation of timber declarations for harvest, purchase of seedlings or seeds, ground preparation and planting, forest protection, timber stand improvement, forest inventories and other directly related work. Preparation of part III, revisions, and Annual Work Plans are inherently land use
planning and therefore considered part of the basic contract, not dependent on forestry funding.

d. Timber harvests and sales. Declarations of timber available for harvest and sale should be submitted to AMCI&SA for approval. Forest products should not be cut, harvested, or sold without the prior written approval of AMCI&SA except that commanders or their delegates are authorized to sell forest products with an estimated value under $1,000 per sale, not to exceed $20,000 per fiscal year, in accordance with AR 405-90. Funds from sales should be deposited to the forestry proceeds deposit account. Forest products should not be given away. See AR 420-74, for additional guidance.

2-18. FISH AND WILDLIFE MANAGEMENT.

a. Cooperative plan agreement. Each installation should consult with the U.S. Department of the Interior, Fish and Wildlife Service, and the state fish and game agency to determine the suitability of installation land and water areas for the conservation and management of fish and wildlife resources. If results indicate that the installation has conducive habitat, a classification of category I should be conferred per AR 420-74, and a Cooperative Plan Agreement prepared and signed by the three agencies involved. Determinations of unsuitability should be submitted to AMCI&SA.

b. Natural Resources Management Plan, Part IV. The comprehensive Fish and Wildlife Management Plan should be prepared per AR 420-74 and TM 5-633 for category I installations. Prepare the plan according to the outline provided in TM 5-633, appendix E. Assistance may be obtained from the AMC Natural Resources Specialist, federal or state agencies.

c. Annual Work Plans. Category I installations are required to prepare an Annual Work Plan that adheres to the suggested format in TM 5-633, appendix E. Forward plans to reach AMCI&SA by 15 February of each year.

d. Funding. Activities are financed from regular operating funds, special fees or agricultural/grazing funds. Preparation of part IV, revisions, and Annual Work Plans are inherently part of the contractor's land use planning responsibility and are not dependent on reimbursable funding. Special fees for hunting and fishing should be charged and the proceeds used on the installation where collected, in accordance with AR 420-74. Authority for using these collected funds should be obtained from AMCI&SA, by using Army Budget for Wildlife Fish and Game Conservation, Military Reservations, Report (RCS: ENG-303) in accordance with AR 420-74. Volunteer efforts by installation personnel, rod and gun clubs, or agricultural lessees may be utilized for fish and wildlife management activities.

2-19. CONSERVATION AWARDS. The voluntary conservation award narrative should be submitted by installations desiring special recognition for their natural resources conservation program. The submission of this report places the installation in competition for the Secretary of Defense Conservation Award and the Chief of Staff Conservation Award. The report covering the activities of the previous 3 years should be submitted to AMCI&SA by 9 February. The eligibility for competition rotates annually between large (10,000 acres and larger), and small (under 10,000 acres) installations. See AR 420-74.

2-20. USE OF PESTICIDES. Pesticide treatments in support of the natural resources program will be in accordance with AR 420-74 and AR 420-76 (see Section VI, Pest Management and Services).

Section IV. FIRE PREVENTION AND PROTECTION

2-21. GENERAL. Establish a formal fire prevention and protection program in accordance with current editions of AR 420-90 and AMC-R 385-100; and the guidelines of this section. In the absence of specific requirements or recommendations, installations should follow the mandatory provisions of nationally recognized fire protection standards and be guided by the advisory provisions of such standards. AMC-R 385-100 contains many unique requirements for fire safety associated with explosives that must be incorporated into the program.

a. Staffing. The fire department should be staffed per AR 420-90.

b. Duties. The fire department is responsible for all fire prevention and protection activities, including: assisting in the organization, administration and supervision of fire marshal activities; formulating regulations covering elimination of fire hazards; instructing fire department personnel in the operation and maintenance of fire apparatus and extinguishing systems; training auxiliary firefighters; training personnel and dependents in fire prevention and protection measures and evacuation drills; making regular fire prevention inspections; performing inspection and preventive maintenance on fire apparatus, firefighting equipment and fire protection systems; responding to fire calls; investigating fires; and preparing and maintaining fire department reports and records.

2-22. WATER SUPPLY SYSTEMS. The water supply pumps, distribution mains, etc., that are part of the fire protection system should be maintained in-service and tested per applicable NFPA standards.

2-23. MOTORIZED FIRE EQUIPMENT. One piece of motorized fire apparatus should be authorized for each manned fire station. In addition, a reserve fire truck should be available to ensure that the required number of fire trucks remain in continuous service. Where conditions warrant, one reserve fire truck may serve more than one installation. A suitable administrative vehicle should also be made available to the fire chief. Inspections and the semiannual service tests of equipment should be performed according to NFPA standards.

2-24. ALARM SYSTEMS. Automatic and manual fire and evacuation alarms should be maintained according to applicable NFPA standards.

2-25. AUTOMATIC SPRINKLERS.

a. Installation. Automatic sprinklers should be installed when thestructure or contents are combustible and one or more of the following conditions exist: al facilities, clubs, etc.

(1) Potential loss of life, e.g., hospitals, recreational facilities, clubs, etc.

(2) Essential operations, such as main boiler and compressor plants as well as water distribution pumps and treatment facilities.

(3) Critical materials occupy the area, e.g., electronic digital computer installations, special electronic equipment, weapons fire-control equipment and special training devices and equipment.

(4) Potential severity of fire, e.g., flammable storage warehouses, process operations involving flammable liquids and explosive manufacturing facilities.

(5) Value of building and contents exceeds 1 million dollars.

b. Maintenance. Automatic sprinkler systems should be maintained according to applicable NFPA standards.

Section V. REFUSE COLLECTION AND CUSTODIAL SERVICES

2-26. GENERAL. Provide for refuse collection, disposal, and custodial services within the guidelines of this section.

2-27. REFUSE COLLECTION AND DISPOSAL.

a. Refuse. As discussed herein, refuse pertains to garbage, ashes, etc. Salable refuse, explosive and incendiary wastes, and contaminated wastes from industrial processes are not included. See AR 420-47, Solid and Hazardous Waste Management.

b. Refuse disposal. Methods generally are limited to disposal by contract, incineration and landfill. Disposal by any method should comply with federal, state and local environmental requirements.

c. Refuse collection. The procedure should be reviewed annually to ensure that it is performed as economically and efficiently as possible.

2-28. CUSTODIAL. The custodial services offered should not exceed the following frequencies:

a. Floors. Clean weekly. Wet mop, buff, strip and rewax as required by floor condition, not to exceed: weekly for wet mopping, monthly for buffing, and semiannually for stripping and rewaxing.

b. Toilets and fixtures. Water closets, urinals, wash basins, dispensers and drinking fountains should be cleaned daily; walls, partitions and woodwork cleaned monthly.

c. Glass surfaces. Windows cleaned semiannually; mirrors (damp wash and dry) weekly.

d. Dusting. Office furnishings dusted weekly; venetian blinds and shades semimonthly; light fixtures, walls, ceilings, etc. semiannually.

e. Other requirements. Specified in the contractor's approved schedule of services.

Section VI. PEST MANAGEMENT PROGRAM

2-29. PURPOSE. This section provides standards and procedures for the pest management program. It sets minimum levels of pest control operations to protect real property that are compatible with national mandates to protect human life and the environment.

2-30. RESPONSIBILITIES. Installation pest management operations will follow a written and AMCI&SA (AMXEN-U) approved Installation Pest Management Plan (IPMP) conforming to the requirements in AR 420-76. The plan will be implemented by DOD, U.S. Environmental Protection Agency (USEPA) or state trained and certified pesticide applicators.

2-31. OPERATIONS. Pest management program operations will follow guidance in AR 420-76. Minimum program requirements follow:

a. Installation Pest Management Plan. An IPMP will be written, reviewed and updated annually. All pest management operations conducted to protect Army real property will be in the IPMP. The original plan and annual updates will be reviewed and approved by AMCI&SA (AMXEN-U). Each IPMP will stress integrated pest management to reduce pesticide use.

b. Training and Certification. Pesticide applicators will be trained and certified according to the procedures established in AR 420-76.

c. Pesticide Procurement. Only USEPA or state registered and approved pesticides will be purchased and used. Pesticide label directions will be followed at all times. The use of pesticides that are not included in the IPMP requires approval by AMCI&SA (AMXEN-U).

d. Environmental Quality. Pest management operations will be planned and conducted to minimize or eliminate adverse environmental effects per AR 200-1 and AR 200-2.

e. Aerial Application. Aerial application of pesticides will be part of the IPMP and conducted in accordance with AR 40574 and AR 420-76. Outleased property will be included. Environmental documentation is needed prior to dispersal of pesticides by aircraft (AR 200-2).

f. Supplemental Pest Control Services. Augmentation contracts will be used to supplement the operating contractor's pest management program when pest control needs exceed the capability of the in-place staff. Augmentation contracts for services from a commercial pest control firm will be established in accordance with procurement regulations and AR 420-76.

g. Records and Reporting. Pesticides, including herbicides, used to protect real property will be recorded and reported on the latest edition of DD Form 1532, Pest Management Report [RCS DD-P&L (A&AR) 1080]. Pesticides used by Agriculture lessees will also be reported.

h. Pesticide Handling. The storage, mixing and disposition of pesticides will confirm with AR 420-76, and Federal, state and local government regulations. Employee safety and environmental protection will be stressed during handling.

i. Pesticide Application. All pesticides will be used in strict accordance with product label directions, and the IPMP.

2-32 NUISANCE ANIMAL CONTROL. Pest control operations (Chemical and nonchemical) to prevent or correct damage to real property by nuisance animals, e.g., raccoons, skunks, feral cats, ground squirrels, pigeons, etc. will be coordinated with the installation natural resources specialist or appropriate maintenance engineering personnel. Control operations will be in accordance with the IPMP.

CHAPTER 3

LAYAWAY AND MAINTENANCE OF INACTIVE REAL PROPERTY FACILITIES

Section I. BUILDINGS, STRUCTURES, ROADS, SURFACED AREAS, RAILROADS AND BRIDGES

3-1. GENERAL. Separate maintenance and repair standards should be established for those buildings and structures to be maintained in a high state of readiness and those to be maintained in a low state of readiness. Buildings and structures in a high state of readiness will be maintained in such condition that they can be activated to support production operations within 90 days after M-day. Buildings and structures in a low state of readiness will receive only the minimum maintenance required to keep the facilities weathertight and prevent rapid deterioration, without regard to activation time. Individual installations may divide these two generalized categories, identifying the critical or noncritical facilities necessary to support current mobilization requirements. The maintenance plan will identify the degree of effort each facility is to receive.

3-2. BUILDINGS AND STRUCTURES.

a. Maintenance. The maintenance program for the inactive buildings and structures will be organized as described for active facilities in chapter 2, section I. The building maintenance plan must include periodic building inspections. The frequency of the inspections will vary depending upon the criticality of each facility and its condition; however, as a minimum, all buildings will be inspected semiannually. These inspections will be performed by personnel qualified in building maintenance. The inspections should be organized to provide a systematic method of recording deficiencies, initiating appropriate corrective action and documenting the final results.

b. Layaway.

(1) Door and window screens will be removed, identified as to location by appropriate markings and stored within the building.

(2) All windows which are readily accessible from the outside of the building will be securely fastened.

(3) One exterior door to each building will be designated as the point of entry and padlocked from the outside. All other doors will be locked or blocked from the inside.

(4) Exterior metal surfaces which are corroded and those which will require protection within a year will be cleaned and painted. Interior metal work will be properly cleaned and painted or treated with suitable preservatives where essential to prevent corrosion.

(5) Loose, damaged or missing windows, doors and siding will be refastened, replaced and repaired as necessary to make the structure weathertight and prevent rapid deterioration.

(6) Complete residing, or extensive repainting of a building or structure to be inactivated will not be accomplished unless economically justified.

c. Maintenance standards.

(1) High state of readiness.

(a) Roofs. Roofs will be maintained in a weathertight condition sufficient to prevent building deterioration. Reroofing may be accomplished when the existing roofing deteriorates to the point where an economic analysis based on maintenance records indicates that reroofing is less costly than continued patching.

(b) Exterior Painting. Surfaces of doors, sash trim and metal will be painted only when necessary to prevent deterioration. Sidewalls should not be painted prior to activation, unless necessary to avoid major deterioration due to moisture infiltration.

(c) Siding. Complete residing should be postponed until activation. Where siding must be replaced to maintain buildings in a weathertight condition, materials similar to the original construction will be used, unless an economic analysis proves an alternate method to be less costly.

(d) Glass. Broken glass in doors and windows will be replaced. Chronic glass breakage will be eliminated by boarding up the opening.

(e) Building access. Only one access (steps, platform, etc.) to each inactive building will be maintained.

(f) Building interiors. Building interiors will be maintained only to provide continued integrity of structural components. General interior painting of walls, ceilings, etc. will not be performed. Spot painting of structural elements will be accomplished when necessary to prevent major deterioration.

(2) Low state of readiness.

(a) Roofs. Roofs generally will be kept weathertight by patching. Reroofing will be accomplished only in instances when patching no longer proves to be the most economical method of providing protection.

(b) Exterior painting. Metal surfaces should be painted when necessary to prevent deterioration. Other surfaces will not be painted prior to activation.

(c) Siding. Complete residing will be postponed until activation. Where patching of small areas is necessary to keep the buildings weathertight, materials similar to the original construction will be used. When large areas must be replaced to maintain the buildings in a weathertight condition, low grade material, such as smooth surface roll roofing attached with battens will be used.

(d) Glass. Broken glass in doors and windows should be replaced where frames are in sound condition. Where frames have deteriorated or chronic glass breakage exists, openings will be boarded up.

(e) Building access. Only one access (steps, platform, etc.) to each building will be maintained.

(f) Building interiors. Building interiors will be maintained only to provide continued integrity of structural components. General interior painting of walls, ceilings, etc., will not be performed. Spot painting of structural elements will be accomplished when necessary to prevent major deterioration.

3-3. ROADS, BRIDGES AND SURFACED AREAS.

a. Organization. The maintenance program documentation will include a set of maps depicting all roads, bridges and surfaced areas classified as inactive, and a schedule for their inspection. The schedule of required repair work meeting criteria in paragraph b below must be maintained current.

b. Maintenance standards. Roads surfaced with concrete or asphalt will be maintained only to prevent major deterioration. Joints and cracks will be kept sealed and drainage facilities cleaned. Resurfacing will be discontinued. Seal coating is discouraged, but should it become imperative to protect the asphalt surface, an exception to policy must be obtained. Surface treatments will be allowed to revert to gravel roads. Gravel roads maintenance will be limited to periodic blading to preserve - the crown for drainage. Bridges and other road structures will be maintained in a structurally sound condition. Follow guidance of paragraph 2-5, except that revalidation of safe loads carrying capacity will be performed prior to activation.

3-4. RAILROADS.

a. Organization. Documentation will include maps identifying all inactive railroad trackage.

b. Layaway.

(1) Switch points will be locked or spiked in closed position at connection with active tracks.

(2) Switch lamps, traffic signals and similar accessories will be removed, clearly identified and stored.

(3) Movable parts of switch mechanisms will be cleaned and oiled to prevent rusting.

(4) Warning signs will be installed at appropriate locations to ensure that tracks will not be used.

c. Maintenance standards. Bridges and other track structures will be maintained in a structurally sound condition; switches will be oiled or greased annually. Maintenance on rails, ties and ballast will be discontinued. Vegetation in ballast, roadbed and ditches will be controlled to avoid damage.

3-5. DRAINAGE. Drainage facilities will be maintained to the extent necessary to avoid water damage to structures and road and railbeds. This will normally consist of cleaning ditches, including controlling brush and tree growth, cleaning culverts and doing minor grading to permit proper water runoff and avoid water ponding against structures and roadbeds.

Section II. UTILITIES

3-6. GENERAL. The guidance provided in this section is applicable to the layaway and subsequent maintenance of inactive utility plants and related systems. Compliance with federal, state, interstate and local environmental policies, standards and procedures must be achieved as described in paragraph 2-8. Corrective action will be programmed per current DOD policy for environmental deficiencies from inactive sources.

3-7. LAYAWAY OF UTILITIES.

a. General. Applicable codes and standards referenced in section II of chapter 2 apply to inactive utility plants and systems. The Energy Conservation Program will relate to the amount of activity at the installation. Layaway methods and procedures will consider total energy conservation practices. Where moisture and other conditions warrant, consideration will be given to cocooning mechanical equipment in place. Deenergizing electrical transformers, or use of the least KVA rating possible will be given top priority. Refer to the table entitled "P-Type Metal Preservatives" contained in TM 38-260 for the correct type coating needed to protect corrodible metal surfaces during layaway.

b. Water. All water lines, coils, water jackets, condensers, pumps, water pans, flash tanks, etc., will be flushed with fresh water and drained. Vents and drains will be left open with plugs wired to the equipment. All pipe threads and finished surfaces left exposed by disconnecting for draining will be protected by a proper preservative. Openings will be provided with screens.

c. Gas. Gas will be shut off on the outside of the building and the lines bled through the equipment. Main distribution lines will be deactivated to the maximum extent possible. Pressure will be bled off, lines capped and connections clearly marked. Cathodic protection systems will be kept active and properly maintained throughout the installation.

d. Tanks and receivers.

(1) Tanks and receivers (except refrigerant) will be drained, opened, wire brushed where feasible, and washed clean of all deposits of mud, scale and other foreign matter. Manholes and handholes will be replaced, with threads and contact surfaces coated with a proper preservative. Drain valves or lowest point openings will be left open with the outlet screened. Fasten unreplaced covers or plugs securely to the tank or receiver.

(2) Interior surfaces of tanks which are not accessible for painting, will be sprayed or fogged with a preservative. The interior surfaces of tanks that are accessible will be cleaned and painted, as indicated by the condition of the existing coating. If corrosion is severe and thorough cleaning and painting are necessary, a vinyl paint system will be applied.

(3) Compressed air receivers will be drained and treated with a proper preservative.

e. Bearings. Journals and journal boxes containing oil lubricated bearings will be drained and refilled with a preservative oil and tagged to drain and refill with the proper lubricant before operation. Grease-lubricated bearings, journals, etc., will be lubricated with grease of the same type as that normally used in operating the equipment. Journal boxes and bearings will be wrapped with waterproof paper and sealed with adhesive tape.

f. Belts. All belts will be removed and tied to the driving pulleys.

g. Ducts and Openings. All supply or discharge air ducts and other outside openings will be blocked and sealed.

h. Surfaces.

(1) Exposed painted surfaces of such items as casings, structural supports, drain pans, stoker ash and soot hoppers, exposed surfaces of brine coolers, etc., will be cleaned and spot painted.

(2) Precision machined exterior surfaces will be coated with preservative and wrapped or covered with a greaseproof barrier material. Unpainted and exposed nonprecision metal surfaces will be coated with a preservative.

i. Instruments. Instruments and controls which are to remain in place, such as gages, thermometers, thermostats and accessories will be wrapped individually with waterproof paper and sealed with adhesive tape. Bonnet and stack mounted controls will be removed, thermostatic elements cleaned and preservative applied and replaced in mounting flange and wrapped. All meter or instrument containers holding water, ink or acid will be drained completely and cleaned. Items which are not replaced will be wrapped as specified above, packed in suitable cartons, properly labeled and securely attached to the equipment of which they are a part.

j. Pumps. Pumps will be flushed with fresh water and drained. Interior surfaces, including such parts as impellers, rotors, pistons, air chambers, etc., will be coated with a preservative. Preservative will be applied by spraying or fogging while slowly actuating the pump. Shafts will be coated with a preservative. All openings will be sealed with pressure sensitive tape. Petcocks will be left open. Pumps subject to flooding will be raised above high water level.

k. Filters. Renewable type air filters for warm air furnaces and air conditioning units will be removed, cleaned and replaced in the unit. Throwaway type filters will be discarded and the dimensions of the filters recorded on a tag attached to the frame.

l. Not used.

m. Fans. Fan wheels and shafts will be removed, cleaned and repainted as necessary. Casings and housings will be dismantled to the extent necessary to clean and repaint properly. The units will be reassembled after painting. Bearing surfaces and journals will be protected with adhesive tape to prevent paint from entering hearing surfaces. Shafts of larger fans will be supported (blocked) to relieve weight on the bearing and shaft.

n. Gears.

(1) Exposed gears will be coated with a preservative.

(2) Enclosed gear housings will be drained and refilled completely with fresh oil (over the specified oil level). Gears will be briefly rotated through the fresh oil to coat them for protection against pitting and rusting. Equipment will be marked with instructions to drain oil in gear housings down to specified oil level before placing equipment in operation.

o. Springs. All springs, packing glands and tension adjusting mechanisms will be relieved of pressure wherever practicable.

3-8. LAYAWAY AND MAINTENANCE.

a. General. Utilities, plants, systems, equipment and plumbing should be inspected semiannually, unless specific equipment guidance directs otherwise. If inspection reveals that protective coatings or measures have failed, the equipment or system must be reprocessed.

Maintain records of missing or broken parts, components or controls which have not been replaced. Such records must be available as a listing of those parts required to put the equipment or system in operating condition.

b. Water supply facilities.

(1) Building connectors. Water service lines to buildings will be closed at the curb valve. Where curb valves have not been provided, they will be installed where necessary to prevent freezing of the service line to the building. Defective curb valves or building service valves will be replaced to avoid water waste from pressurized mains.

(2) Distribution systems. Water main distribution system will be kept in service to the extent needed for fire protection support. If water supply configuration allows, untreated (nonpotable) water should be utilized in inactive areas.

(3) Water purification plants.

(a) Water purification plant equipment will be cleaned, drained and treated with proper preservatives.

(b) Sedimentation basins, filters, storage tanks and clear wells will be drained, and where possible, outlets will be arranged so that they will not hold water.

(c) Chlorine cylinders, calcium hypochlorite, acids, strong alkalies and poisons will be removed from the plant and the laboratory.

c. Sewage treatment plants. Where practicable, and while still complying with the requirement of local, state and federal environmental laws, sewage treatment plants or plant components will be inactivated. Sewage collection systems serving inactive areas should be blocked off to the maximum extent possible to avoid unnecessary discharge to treatment plants serving both active and inactive facilities. Exposed metal components will be cleaned and protected by painting or treatment with a proper preservative. The plant components will be inactivated as prescribed below:

(1) Pits and grit chambers will be drained and cleaned; screens and comminutors will be cleaned.

(2) Sedimentation tank, activated sludge and contact aeration-type plants will be drained and cleaned. Where not drainable, they will be filled with clean water and treated to reduce mosquito and algae growth.

(3) Trickling filters will be shut down, all lines drained and open lines sealed or capped. Rotating arm bearings will be serviced.

(4) Sludge digestion tanks must be drained slowly (at the rate of about 10 to 15 percent of the contents per week) to sludge drying beds. Caution will be exercised to prevent explosions. Because of dangers of gas poisoning, no personnel will enter the digesters while they are being drained. When the sludge digestion tank has been emptied, it will be thoroughly ventilated and cleaned, and collection lines thoroughly purged and ventilated.

(5) Sludge beds will be cleaned and an approved soil sterilizer applied to prevent growth of vegetation.

(6) Pumps and lines, including inlet lines carrying sewage or sludge, will be drained and washed. Where necessary, pumps may be left operable to remove any water infiltration.

(7) All mechanical equipment will be drained, cleaned and properly lubricated.

d. Electrical facilities, general. All circuit breakers and switches in distribution and control panels will be left in the open position. Mechanical operating linkages will be properly lubricated. Lightning protection systems will remain operational unless auxiliary grounding methods are used. Spot painting will be done for preservative purposes. Equipment containing insulating oil will be inspected, and insulating oil added where necessary to maintain the prescribed level. Transformers, capacitors, circuit breakers and other devices containing PCB will be periodically inspected for leaks and corrective action taken in compliance with the latest EPA requirements. PCB identification and records will be maintained current. Enclosures and auxiliary heating will be provided for electrical equipment where required to prevent the accumulation of moisture and subsequent corrosion. Electric current carrying parts, plates and bus bars will not be painted.

e. Substations (indoors and outdoors).

(1) Outdoor structures will be maintained structurally sound and weatherproof.

(2) Prescribed liquid dielectric levels will be maintained.

(3) Dielectric tests will be performed on a representative percentage of equipment annually to determine any impairment of the insulating oils.

(4) A representative percentage of equipment will be tested annually to determine any accumulation of water. Water which may collect at the bottom of insulating liquid will be drained off and the proper oil added to raise the level to the prescribed height.

(5) Enclosure will be kept clean and free of vegetation. Fence gates will be locked.

(6) The metal-clad switch gear will be protected to avoid corrosion.

(7) Energized transformer capacity will be reduced to a minimum and unnecessary transformers will be disconnected. Where practical, small transformers will be installed to reduce energy consumption.

(8) Gaskets and bushings on all inactive equipment will be inspected and replaced as necessary. All bolts will be tightened to prevent entrance of moisture.

(9) Storage batteries will be inactivated and maintained as follows:

(a) Batteries will be charged until all cells gas. All required water will be added during charging so that gassing ensures thorough mixing.

(b) When inactivation is completed, all fuses will be removed to prevent use of battery during idle period. Vent plugs should be in place.

(c) Repeat charging procedure annually, unless inspection history or manufacturers' requirements dictate more frequent recharging.

f. Electrical distribution systems. The system supplying inactive areas will be de-energized to the greatest extent possible. Open switches and disconnected wires will be identified and recorded on distribution drawings.

(1) Overhead distribution. The inactive overhead distribution system will be maintained in a sound condition. The maintenance program

will include a pole and cross arm inspection schedule. Deteriorated poles and cross arms will be replaced, strain points and conductor sag maintained, oil level in transformers maintained, oil circuit breakers maintained operable, and the oil periodically tested for insulation dielectric strength. Inactive portions of the distribution system will be properly grounded and inspected to assure system protection. Trees and other brush will be trimmed or removed to maintain line integrity.

(2) Underground distribution.

(a) Ducts and manholes will be inspected annually and whenever flooding is suspected. Manholes will be pumped out as necessary.

(b) Insulation tests will be run on a representative sample of circuits annually.

(c) Only cable required for operation of standby facilities will be maintained. Records of all cable will be kept current.

(d) Potheads, junction boxes and splices will be inspected annually and repaired as necessary.

g. Street and protection lighting. Lighting systems required for safety or security will remain energized. Maintain only the minimum number lights necessary to satisfy safety and security requirements. All other systems will be completely de-energized by disconnecting both the primary and secondary transformer leads from the system. Time clocks and photoelectric-type control switches for de-energized systems will be removed from outdoor locations, properly identified, enclosed in a wrapper and placed in dry storage.

h. Interior electric systems.

(1) All interior electric circuits, except circuits required for building protection, if any, will be de-energized. Service entrance switches will be locked in the open position. Local switches will be left open.

(2) Switches on all other electrical equipment will be left open. Where controls are contained in general purpose enclosures, the enclosures may have to be sealed to provide adequate protection. Enclosures classified weathertight and higher will provide adequate protection.

(3) A representative number of conduits, circuits and switches will be inspected annually.

(4) Electric lamps will be left in place. Only lamps required for maintenance, security and safety illumination will be replaced.

i. Rotating equipment.

(1) Open-type motors will be cleaned only when lubricants collecting on the windings threaten to cause serious deterioration of the insulation.

(2) Synchronous, wound rotor and direct current machines will be laid-away and maintained as follows:

(a) Relieve brush spring tension and insert a piece of varnished cambric between each brush and the slip ring or commutator.

(b) Rotors of the larger machines will be blocked to separate the shaft from the bearings.

(c) Auxiliary heating or dehumidified storage will be provided for the preservation of motors and generators rated 600 volts or above and for other electrical equipment when justified. Dehumidified storage will be provided for all steam turbine-generator units.

(d) Lubricating cups and reservoirs will be kept filled and machined surfaces kept coated with a proper preservative oil.

(e) A representative number of motors and generators will be "megger" tested annually to determine if serious decline in insulation resistance has occurred. Records of each motor will be maintained.

j. Instrumentation. Instruments mounted in panel boards will normally be sealed in place rather than removed from the panel board. Instruments exposed to weather or other adverse conditions will be removed, cleaned, tagged for location and placed in dry storage. All fuses, batteries and corrosion will be removed prior to storage.

k. Electric elevators.

(1) If the main guide rails and counterweight rails are steel, the face of each rail for the full length of shaft will be coated with a proper preservative. The safety and limit switch enclosures will be cleaned and painted if they are not galvanized. The structural steel,

governor tension-sheave and buffer springs in the elevator pit will be painted with a good rust preservative paint. The channel cross head of the car, cable thimbles, rail shoes and the car safety device, including the channel irons supporting the platform, will be painted where required. The counterweights will be landed in the pit and the car blocked up in the top hatchway to relieve tension on cables. The elevator shaft door openings will be closed from the rest of the building.

(2) Elevator hoisting machines will be left in place without disassembly. The brake will be relieved of all tension and the drum coated with a proper preservative. Corrosion will be removed and the metal cleaned and spot painted. The electric motors and generators will be maintained as specified in paragraph i (rotating equipment). The grooves of the machine and governor sheaves will be coated with a proper lubricant.

(3) The main switch serving the control board will be locked in the open position and an information tag fastened on the handle. The control board should not be removed; however, to reduce corrosion, the panel must be vented or other positive means used to control moisture. If natural ventilation is not feasible, the control board may be enclosed in a good insulation material and a light bulb or other acceptable auxiliary heating device placed inside to reduce condensation.

l. Not used.

m. Engine generator sets.

(1) Manufacturer instructions, if available, should be followed. Otherwise, the engine should be drained of all fuel and engine coolant. The crankcase oil should be drained and refilled with an engine preservative oil and tagged to drain and refill with the proper lubricant before placing in operation. The same preservative oil will be poured in the sparkplug holes. The sparkplugs will be replaced and the intake and exhaust will be sealed. The cooling system may be left empty; however, the fan belt should be left slack.

(2) The generator portion will be cleaned and covered with a dust cover. If the generator is not stored in a humidity controlled area, positive steps must be taken to minimize corrosion. If natural ventilation is not sufficient, an auxiliary heat source will be utilized.

n. Heating systems and boiler plants.

(1) General. Remove all coal, ashes and products of combustion from equipment. The fireside should be scraped, wire brushed, washed when necessary and sprayed with a film of oil. The interior of breechings and large steel stacks should be cleaned of all products of combustion by scraping and wire brushing, and then sprayed with a film of oil. Small stacks will be disconnected or blocked off from boilers and heating equipment. Cap all stacks. If evidence of sweating and corrosion is noted on the external surfaces of boilers, furnaces, tanks, unfired pressure vessels and the like, take action to minimize corrosion by painting, or using desiccants or portable heating or dehumidification equipment. During the first year a special inspection will be made of firesides of furnaces, heaters and boilers, since oil will loosen rust and soot, leaving unprotected areas. These should be resprayed with a film of oil. Attention will be given during inspections to the condition of the desiccants placed in boilers. Open and inspect boilers every nine months. Desiccants will be rejuvenated or replaced when the absorbing properties are no longer effective.

(2) Boilers. Boilers, other pressure components and all piping will be completely drained, dried, cleaned and treated as follows:

(a) Water remaining in the bottom of the drums, shells, water legs or headers will be sponged out. Superheater and circulating tubes which will not drain by gravity will be blown out with compressed air. Moisture not removed by this process will be removed by circulating air, or by a light fire in the furnace.

(b) Boilers will be cleaned internally by turbining or scraping tubes and scraping and wire brushing drums, shells, or water legs. Deposits of salt, scale and corrosion will be removed.

(c) A protective coating will be applied on interior surfaces of drums and on all internal surfaces wherever sufficient crawl space permits. Where space does not permit, such as in some types of horizontal fire-tube boilers, the boiler shell will be protected in the most economical manner. Surfaces to be coated will be cleaned to the bare metal prior to application of the coating. This will necessitate the removal of drum internals in whole or in part for access. Parts removed will be carefully match-marked and reassembled after coating.

(d) Exposed exterior surfaces of drums, shells, water legs and water walls will be cleaned and painted. Feed trough will be reinstalled level. All drier screen sections will be correctly spaced to avoid open spaces through which drops of water might be carried.

Quicklime or silica-gel will be placed in pans in all drums and in the shells of horizontal return tube or fire box-type boilers equipped with manholes. The amount of lime or silica-gel used will be 50 pounds plus 10 pounds per 100 horsepower of boiler rating.

(e) Broken gaskets will be replaced. All manhole plates which have been removed will be replaced and all lines closed to prevent entrance of air. The bonnets of boiler valves will be removed, all finished surfaces greased or otherwise protected and the valve reassembled. Tubular gages, illuminators and floor mirrors will be removed, cleaned and stored. Alarm-type water columns will be opened and knife edges, valve parts and other parts subject to corrosion will be coated with grease or other rust inhibitor.

(f) Soot will be removed from soot blowers and valve parts, gears and other contact surfaces will be greased. Deposits of soot will be removed from fans, ducts and dampers, and exposed areas will be painted. Bearing surfaces of dampers and bearing-operated mechanisms will be thoroughly grease coated and fan inlets closed and sealed to prevent air circulation.

(3) Coal and ash-handling equipment. Coal and ash-handling equipment, including weighing devices, will be cleaned and all running parts greased. Remove all coal from the plant and return it to the central storage location. If the coal is not needed elsewhere on the installation, and if practical, transfer the coal to another installation. Periodic inspection for spontaneous ignition characteristics must be made of any coal in storage.

(4) Feedwater equipment. Feedwater heaters, deaerators and vent condensers will be drained completely. The equipment will be opened and all deposits of silt and scale removed. Equipment will be left open. Vent pipes will be capped and the exhaust head covered. Overflow and oil traps will be cleaned and reassembled.

(5) Steam pumps. Steam lines, water lines and cylinders will be drained. Openings will be capped or blocked off. Parking nuts will be loosened and connecting rods covered with heavy grease. A small amount of cylinder oil will be poured into the steam chest and the valves moved to ensure a coating between the valves and seats. Enough oil will be used to ensure a coating on the cylinders, rings and pistons. Petcocks will be left open. All other openings will be covered.

(6) Water softeners (zeolite).

(a) Steel pressure-type softeners will be regenerated in the usual manner, then drained by the lowest drain connection or drain plug. The top manhole, handhole or plug will be removed. Water lines will be drained and openings capped or blocked off. Softener tanks, valves and piping will be cleaned and painted. The inside of the tank will be scraped and cleaned above the zeolite bed and painted with a bituminous base paint. Manhole covers will be left open, or plugs taken out and fastened securely to the tank or piping. The brine or salt tanks will be emptied, scraped, washed clean and painted with a bituminous base paint both inside and out. Salt will be stored in a dry area or used elsewhere.

(b) Wood gravity type softener will be regenerated and kept filled with water to prevent drying, and provisions made to protect tanks from freezing. Pipelines will be drained, disconnected and capped; exterior surfaces will be cleaned and painted.

(c) Multiport valves of either manual or automatic type will be greased internally. Hydraulic valve lines will be drained and cleaned.

(7) Combustion equipment.

(a) Pulverizers and stokers will be run until all coal has been removed from the screw conveyors, mill and hopper. Coal will be removed from hopper and bin or bunker and returned to central storage. Oiled sawdust will then be run through the screw conveyor until all surfaces are covered with an oil film. The hopper will be closed tightly with either a wood or metal cover. Coal clinkers and ashes will be removed from the tuyeres, ash pit, dead plates and plenum chambers. The inlet side of the fan will be closed. Stokers with hydraulic power or ram-type feeds will be left with oil in pumps and piping for hydraulic power. Openings on reservoirs will be closed tightly. Blowers on pneumatic spreader-type stokers will be tightly closed. Heater pipes will be closed with wood or metal covers.

(b) The firing end of oil burners will be covered with heavy dustproof and weatherproof paper tightly fastened in place. All oil will be drained from the pump, valves, lines and reservoirs. Burners that can be swung out from the firing port will be wrapped with dustproof and weatherproof paper. Removable orifices will be cleaned, oiled, sealed in

a wrapper and attached to the burner. Openings on oil tanks will be closed. All oil will be removed from the system. If possible, oil from a deactivated plant should be used elsewhere on the installation and stocks rotated to avoid deterioration. Oil remaining in long term storage must be periodically tested, and procedures established to utilize the fuel before it deteriorates.

(c) Gas burners will be cleaned to remove gums, sulfates and other foreign matter. Louvers will be closed and fastened or blocked. Primary air openings will be closed.

(8) Steam supply and condensate return system.

(a) Supply and return lines will be completely drained of all condensate by removing all drain plugs or drilling and tapping drain holes at the low points. Systems will be dried by operating a vacuum pump, or by introducing compressed air into the system for approximately 24 hours. Drain plugs will then be screwed in with only a few turns to facilitate future drainage of moisture. All openings will be covered tightly with caps, blank flanges, or wooden plugs firmly fastened in place. Underground distribution systems will be inspected at manholes annually and when flooding is suspected. Manholes and pump pits will be pumped out when flooded. Waterproof coating on insulation of overhead steam distribution systems will be maintained. Damaged or deteriorated pipe supports will be repaired or replaced.

(b) Traps and strainers will be cleaned and drained. Traps will be left in working condition.

(c) For pressure reducing valves, equalizing pipe between diaphragm chamber and low side of system will be opened and drained. Valves will be opened, drained and cleaned internally. The lower section of the valve will be loosened to provide drainage. Working parts and machined surfaces will be protected with a light oil coating. Vents on the low pressure side of the valve will be opened.

(9) Small heating plants.

(a) Steam and hot water boilers and combustion equipment will be processed substantially as (1) above. Manhole and handhole gaskets will be greased with a mixture of cup grease and graphite. The boiler will be closed tightly.

(b) Direct-fired space heaters will be cleaned of all deposits of soot, ashes and other products of combustion. Coal will be removed from bunker or bin and returned to central storage. Oil will be drained from reservoirs and removed from the plant. Natural gas and propane supply will be shut off outside the building; lines to the equipment will be purged of gas and the line shut off or capped at the unit. Grates will be left in place. Other coal-firing equipment will be cleaned and placed in the firebox, and the door closed and securely wired. The ash pan will be left in place and the ash door closed and securely wired. Draft controls in stacks will be blocked closed. All primary and secondary air openings will be closed. Smoke or vent pipes will be completely removed, cleaned, tagged and stored in the same building. Building opening will be covered or sealed to avoid entry of pests or rain.

(c) Indirect-fired equipment supply and return lines will be drained and vents left open. Where construction of unit heaters prohibits the covering of motors, the unit will be wrapped with dustproof and moistureproof paper.

(10) Water heating equipment. Water heater tanks will be drained completely. Tanks will be opened and all deposits of silt and lime will be removed. Water lines will be drained and openings capped or blocked off. Heaters will be left open. Vent pipes will be capped. Smoke or vent pipes will be completely removed, cleaned, tagged and stored in the same building. Building openings will be covered or sealed.

o. Gas distribution system.

(1) When gas is required at an inactive installation, inactive areas will be cut off from the remainder of the installation by closing all valves on distribution lines at the boundaries of the area. Where there is no requirement for gas at the installation, the main shutoff valve will be closed and locked. The gas distribution map should indicate the status of all lines and valves. The dielectric union or flange in the riser at each building will be checked to assure electrical discontinuity. A new dielectric fitting will be installed for those defective or not of the dielectric type so that the gas line will be isolated from other underground utilities and grounding systems. Where equipment is disconnected from the distribution system, the pipe openings will be capped or blocked off. Plug cocks will be lubricated. Parts subject to corrosion will be grease coated. Packing on stop valves will be lubricated with a few drops of graphite-bearing oil or the packing

will be covered with graphite bearing grease. Plugs from drains and drips will be removed at all low points and lines blown thoroughly before the gas is turned off, to remove water and light oils which are condensed from the gas. Drain plugs will be replaced securely. Drip pots will be removed, emptied of condensate and replaced.

(2) Gas meters will be disconnected and drained. Weights will be removed from the regulating arms.

(3) The liquefied petroleum gas (LPG) supplier will be notified to remove all privately-owned containers and regulating equipment from the installation. Arrangements will be made with the supplier for the removal of entire stocks of LPG stored in permanently installed systems. CAUTION: Safety practices prescribed for LPG must be observed when working around LPG tanks and systems.

p. Petroleum products, storage and distribution systems.

(1) Wherever practicable, stocks of petroleum products will be depleted through attrition during the period preceding inactivation. Stocks which cannot be consumed will be transferred to active installations or otherwise removed from the responsibility of the inactivated installation, unless authority for extended product storage is granted. If storage is authorized, above ground vessels should be used. Operation and maintenance procedures for active storage will be followed. Closure of underground storage tanks (UST) requires compliance with environmental regulations for determining if any environmental damages were caused by the UST while storing a regulated substance. This guidance is beyond the scope of this Pamphlet, but additional information may be found in 40 CFR Part 280. The following is the general procedure for laying away a storage tank that would be reused at activation.

(2) The UST will be emptied, purged and cleaned of all product. Ballasting of UST will be done only if the tank is not anchored and flooding or a high water table presents a flotation problem. Ballast will be a non-regulated substance; water may be used if freezing is not a problem. Water ballast used in steel tanks will have sufficient caustic soda (NaOH) added to provide a pH value of 11. All cathodic protection will remain active and be maintained.

(3) Above ground tanks will be drained, purged, cleaned and preserved against corrosion. All openings will be plugged or capped. Provisions will be made to avoid ponding of water in dikes surrounding laidaway storage tanks.

(4) Records of all tanks will be kept and tanks should be marked, indicating: date of inactivation, last product contained, method of layaway and type of ballasting material.

(5) Distribution piping will be drained and purged. All openings will be capped or closed off with blank flanges.

q. Refrigeration and air conditioning.

(1) Mechanical refrigeration systems will be pumped down and the refrigerant stored in receivers. When receiver capacity is inadequate to store complete charge, excess refrigerant will be removed and placed in storage cylinders. Receiver connections and valves will be tested for refrigerant leaks. The crank case will be filled with the oil normally used in operating the equipment to cover seals and main bearings and the compressor red tagged as follows: "Do not operate until excess oil has been removed." The valve plate will be flooded and seal housing filled with oil normally used in operating the equipment. Cooler and condenser coils will be wire brushed and cleaned with compressed air. Aircooled condensers that are heavily filmed with greases will be cleaned by using an approved solvent.

(2) Interior surfaces of refrigerators will be cleaned. Movable shelving and floor gratings will be removed, cleaned, dried and replaced in refrigerators. Meat hooks, ice trays and defrosting dishes will be removed, cleaned and given a protective coating of corrosion preventive suitable for food handling machinery and equipment (nontoxic). The items will be wrapped with a greaseproof barrier material, tagged and replaced in refrigerators. Door gaskets will be cleaned with soap and water. Paper will be placed between gasket and cabinet before closing the door.

(3) Mechanical air conditioning pneumatic control systems, including air compression equipment, will be drained of water deposits and blown out. Controls and linkage subject to corrosion will be coated with a proper preservative.

r. Evaporative cooling and ventilating equipment. Nozzles and distributing headers or troughs will be cleaned. Humidifying pads or filtering elements not suited for further use will be discarded and the equipment tagged identifying needed replacement items. Usable pads and filters will be removed, cleaned and replaced in the unit. Fans will be blocked to prevent rotation. Screens will be repaired and openings will be sealed or screened to keep pests out.

s. Air compressors. Air compressors lubricated from the crankcase of the main engine will be lubricated with preservative oil at the time the main engine is prepared for layup. The crankcase of air compressors having a separate crankcase will be drained and filled to the proper level with engine preservative oil and operated for 5 minutes. While operating against atmospheric pressure, engine preservative oil will be sprayed into the air intake, with the air cleaner removed, until oil coming from the unloader line or discharge line shows no evidence of emulsification. All openings will be sealed with pressure-sensitive tape.

t. Plumbing. Water closets and urinals will be flushed and thoroughly cleaned with a brush and disinfectant. After the water supply is shut off, water closet tanks will be flushed and dried. Lavatories and showers will be cleaned and faucets turned on to drain water from the pipes. All outside faucets will be opened and drained. Traps in the drainage system and plumbing fixtures, not necessary to prevent backflow of sewer gases, will be drained or mopped dry. Where necessary to retain a trap seal, an approved permanent antifreeze solution will be added to prevent freezing. Inspection procedures will include scheduled replenishment of the solution to maintain the seal. Outside hose bibs may need the lines blown dry, or otherwise protected from freezing.

u. Cathodic protection of underground pipe lines (gas, water, steam, etc.) will remain active. Arrangements will be made for performing annual scheduled inspections and maintenance on all operating cathodic protection systems during the inactive period. A service contract with a firm specializing in this work is recommended. Steel gas lines and underground steel storage tanks will be isolated from other underground utilities, particularly copper grounds, when laid away. In the case of inactivated elevated tanks, the rectifier and anodes will be removed, identified and placed in dry or controlled storage. All electrical equipment that is removed will be properly tagged for identification. All storage tank openings will be effectively sealed.

Section III. NATURAL RESOURCES-- MAINTENANCE OF LAND, FORESTS AND WILDLIFE

3-9. GENERAL. The Natural Resources Program will be managed as outlined in section III, chapter 2, modified as follows.

a. Mowing will be reduced. Maintenance will be adequate to control noxious weeds as required by state laws.

b. Drainage will be maintained and erosion controlled as necessary.

c. Greater emphasis will be placed on agricultural outleasing, particularly in the provision of maintenance services by lessees.

d. Forest and Fish and Wildlife Management continue as stated in chapter 2, with more emphasis on areas inaccessible during active status. Increased public use for hunting, trapping and fishing will be emphasized.

Section IV. FIRE PREVENTION AND PROTECTION

3-10. GENERAL. The fire prevention and protection program will be organized and operated as outlined in section IV, chapter 2, using the applicable portions of AR 420-90, Fire Prevention and Protection.

Section V. REFUSE COLLECTION AND CUSTODIAL SERVICES

3-11. GENERAL. Only the minimum necessary refuse collection and custodial services will be provided and conducted within the limitations of section V, chapter 2.

Section VI. PEST MANAGEMENT OPERATIONS

3-12. GENERAL. Pest management operations on inactive installations will be limited to that required to protect the health of personnel and to prevent the destruction of Army property. Preventive and corrective actions to reduce or eliminate damage to real property by wood destroying pests (e.g. termites, fungi/wood rot, rodents, etc.) and the proliferation of noxious weeds will be accomplished within the guidance of section VI, chapter 2.

APPENDIX

DEPARTMENT OF THE ARMY PERTINENT TECHNICAL MANUALS

(See DA PAM 310-1 for latest date and title)

TB 700-4	Decontamination of Facilities and Equipment
TM 5-609	Military Custodial Services Manual
TM 5-610	Facilities Engineering Buildings and Structures
TM 5-615	Concrete and Masonry
TM 5-617	Maintenance and Repair of Roofs
TM 5-618	Paints and Protective Coating
TM 5-623	Pavement Maintenance Management
TM 5-624	Maintenance and Repair of Surface Areas
TM 5-627	Maintenance of Trackage
TM 5-628	Railroad track Standards
TM 5-629	Herbicide Manual for Noncropland Weeds
TM 5-630	Natural Resources-Land Management
TM 5-631	Natural Resources-Forest Management
TM 5-632	Military Entomology Operational Handbook
TM 5-633	Natural Resources - Fish and Wildlife Management
TM 5-634	Refuse Collection and Disposal: Repairs and Utilities
TM 5-635	Natural Resources - Outdoor Recreation and Cultural Values
TM 5-642	Warm-air Furnaces: Repairs and Utilities
TM 5-643	Preventive Maintenance for Heating Plants and Systems
TM 5-644	Boiler Heating: Repairs and Utilities
TM 5-646	Space Heaters: Repairs and Utilities
TM 5-650	Central Boiler Plants: Operation & Maintenance
TM 5-651	Central Boiler Plants: Inspection and Preventive Maintenance Services
TM 5-652	Steam, Hot-water and Gas Distribution Systems: Repairs and Utilities
TM 5-653	Steam, Hot-water, and Gas Distribution Systems: Inspection and Preventive Maintenance Services
TM 5-654	Maintenance and Operation of Gas Systems
TM 5-660	Maintenance and Operation of Water Supply, Treatment, and Distribution Systems
TM 5-661	Inspection and Preventive Maintenance Services for Water Supply Systems at Fixed Installations
TM 5-662	Swimming Pool Operations
TM 5-665	Operations and Maintenance of Domestic and Industrial Wastewater Systems

APPENDIX--CONTINUED

TM 5-666	Inspections and Preventive Maintenance Services, Sewage Treatment Plant and Sewer Systems at Fixed Installations
TM 5-670	Refrigeration, Air Conditioning, Mechanical Ventilation, and Evaporative Cooling
TM 5-671	Preventive Maintenance for Refrigeration, Air Conditioning, Mechanical Ventilation, and Evaporative Cooling
TM 5-675	Solid Fuels Operations
TM 5-678	Petroleum, Oils, and Lubricants (POL)
TM 5-682	Electrical Facilities Safety
TM 5-683	Electrical Interior Facilities
TM 5-684	Electrical Exterior Facilities
TM 5-695	Maintenance of Fire Protection Systems
TM 5-725	Rigging
TM 5-744	Structural Steelwork
TM 5-745	Heating, Ventilating, Air Conditioning, and Sheetmetal
TM 5-760	Interior Wiring
TM 5-764	Electric Motor and Generator Repair
TM 5-811-7	Electrical Design: Cathodic Protection
TM 5-812-1	Fire Prevention Manual
TM 5-812-2	Firestopping
TM 5-813-4	Water Supply, Water Storage
TM 5-823-4	Marking of Army Airfield-Heliport Operation and Maintenance Facilities
TM 5-830-2	Establishment of Herbaceous Ground Cover
TM 5-830-3	Dust Control for Roads, Airfields, and Adjacent Areas
TM 5-830-4	Planting and Maintenance of Trees, Shrubs, Ground Covers, and Vines
TM 5-848-1	Gas Distribution
TM 5-848-3	Ground Storage of Coal
TM 5-850-2	Railroad Design and Construction at Army and Air Force Installations
TM 38-260	Preparation of Industrial Plant equipment for Storage and Shipment

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FOR THE COMMANDER:

OFFICIAL:

WILLIAM B. McGRATH
Major General, USA
Chief of Staff

THOMAS H. DOLAN
Chief, Operations and Systems
Integration Division

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